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sense and simplicity

Quo Vadis CISPR-15 and CISPR-30

Considerations for a sustainable standardization system
for
radio disturbance measurements of lighting equipment

DKE 767.11.15 ACI meeting in Ludenscheid
February 28, 2013

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Content:

- Definitions of IEC 34/170/CD / IEC 62504 Ed 1
- Overview of [LED-Systems](#), [LED-Control-Gear](#), [LED-Light-Sources](#) and [LED-Luminaires](#) according definitions of IEC 34/170/CD / IEC 62504 Ed 1
- [Present standardization philosophy](#)
- Overview of [work in progress](#) and [upcoming activities](#) based on [present standardization philosophy](#)
- Conclusion
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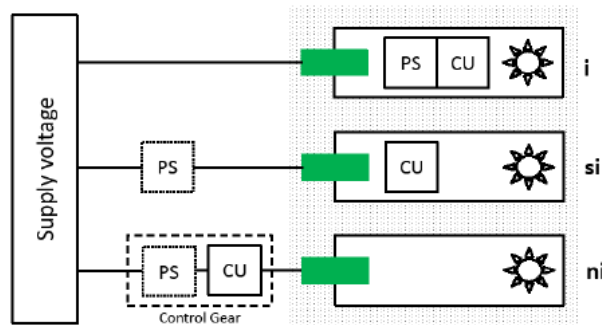
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A.2 Overview of systems composed of LED light sources and LED controlgear

Definitions of IEC 34/170/CD / IEC 62504 Ed 1



PS – Power Supply
CU = Control Unit
PS in dotted box = Optional

Cap/Holder for **user replacement / retrofit** = LED Lamp
Interface which may or may not allow **luminaire manufacturer to replacement / upgrade** = LED Module

 represent in this drawing one or more LED package(s)

NOTE 1 Supply voltage does not mean necessarily mains voltage, e.g. 230V / 50Hz. An "integrated LED lamp" can also be driven on a supply voltage with 12V a.c. or d.c.(may be provided by a power supply or batteries). The "LED controlgear" mentioned in the above sketch of an "integrated LED lamp" then provides the conversion of 12V a.c. or d.c. to a special current and voltage to power up the LED or LED module inside the "integrated LED lamp".

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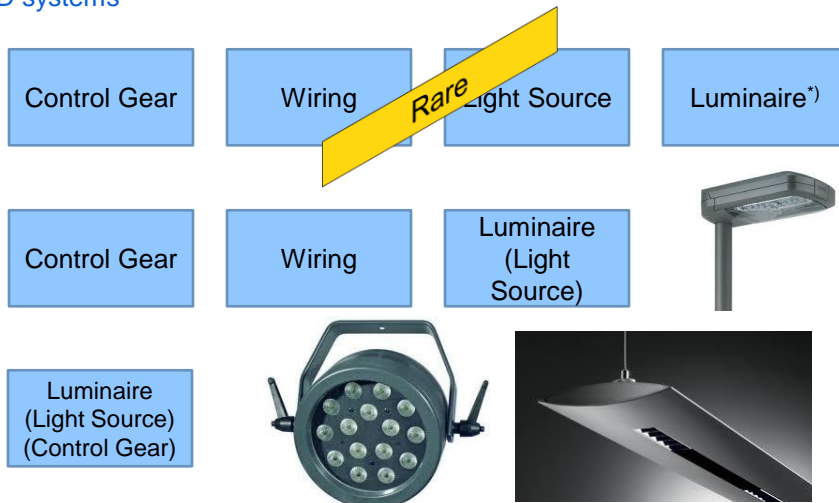
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5

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LED systems



*) Independent luminaire; LED light-source is connected via a glass fiber with the luminaire

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6

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LED Control gear:

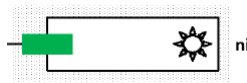
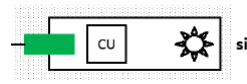
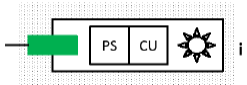
Functionality	Embodiment		
Power Supply (PS)	Electro-Magnetic Transformer (EMT)	Built-in	
		Independent	
	Electronic Transformer (ET)	Built-in	Class-I
		Independent	Class-I
Power Supply (PS) + Control Unit (CU)	ET	Built-in	Class-I
		Independent	Class-I
	ET	Built-in	Class-II
		Independent	Class-II

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7

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LED light sources



LED light sources

LED module



Without Heat-sink



With Heat-sink



Without Heat-sink



With Heat-sink



LED lamps

Retrofit



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8

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LED luminaire:

Embodiment

Embodiment		
Independent (LED light-source is connected via a glass fiber with the luminaire)		
Dismantable or Non-dismantable	Linear	Class I
		Class II, with metal parts
		Class II, without metal parts
	Compact	Class I
		Class II, with metal parts
		Class II, without metal parts
	Large	Class I
		Class II, with metal parts
		Class II, without metal parts

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9

PHILIPS

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10

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Present standardization philosophy

CISPR 15 ed. 7.2

- All limits and test @ luminaire level
- Applicable to:
 - Luminaires
 - Independent auxiliaries
 - Self-ballasted lamps

CISPR TR 30-1 and 30-2 (ed. 1)

- Reference luminaires to evaluate control gear for *standardized*¹⁾ discharge lamps

1) Standardized discharge lamps resulted in limited deviations of the real luminaires

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CISPR 15 & 30 related:

- Partly covered by CISPR 15 ISH "Assessment of retrofit ELV LED lamps"
 - Further developments in AK 767.11.15
 - Hardware reference setup incl. reference PS EMT
 - or
 - Software reference setup (proposal IARU)
- New measurement setup for independent control gear needed in CISPR 15
- Running ERCO - Philips investigation
- Proposal for measurement setup
 - Reference ET & NI module needed
- Not yet addressed
- Proposal for measurement setup
 - Reference ET & NI module needed

Control Gear		Wiring		Luminaire (Light Source)		
Control gear Independent		+	Wiring	+	Luminaire Class I	
					LED light source	
					Module	Retrofit Lamp
	PS (EMT)				SI	SI
	PS (ET, Class I)				SI	SI
	PS (ET, Class II)				SI	SI
PS + CU (ET, Class I)	NI	NI				
PS + CU (ET, Class II)	NI	NI				
Control gear Independent		+	Wiring	+	Luminaire Class II with metal parts	
					LED light source	
					Module	Retrofit Lamp
	PS (EMT)				SI	SI
	PS (ET, Class I)				SI	SI
	PS (ET, Class II)				SI	SI
PS + CU (ET, Class I)	NI	NI				
PS + CU (ET, Class II)	NI	NI				
Control gear Independent		+	Wiring	+	Luminaire Class II without metal parts	
					LED light source	
					Module	Retrofit Lamp
	PS (EMT)				SI	SI
	PS (ET, Class I)				SI	SI
	PS (ET, Class II)				SI	SI
PS + CU (ET, Class I)	NI	NI				
PS + CU (ET, Class II)	NI	NI				

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Luminaire (Light Source) (Control Gear)

CISPR 15 & 30 related:

- CISPR 15 clause 8.6 reference luminaire
 - Update needed for tighter luminaires for retrofit lamps
 - Additional reference luminaires needed for Modules
- CISPR 30 activities within AK 767.11.15
- Philips studies linear NI modules
 - Others study compact & large NI modules
- Not yet addressed

Luminaire, Class I		
Control gear Built-in	LED light source	
	Module	Retrofit Lamp
-----	I	I
PS (EMT)	SI	SI
PS (ET, Class I)	SI	SI
PS (ET, Class II)	SI	SI
PS + CU (ET, Class I)	NI	NI
PS + CU (ET, Class II)	NI	NI
Luminaire, Class II with metal parts		
Control gear Built-in	LED light source	
	Module	Retrofit Lamp
-----	I	I
PS (EMT)	SI	SI
PS (ET, Class I)	SI	SI
PS (ET, Class II)	SI	SI
PS + CU (ET, Class I)	NI	NI
PS + CU (ET, Class II)	NI	NI
Luminaire, Class II without metal parts		
Control gear Built-in	LED light source	
	Module	Retrofit Lamp
-----	I	I
PS (EMT)	SI	SI
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PS (ET, Class II)	SI	SI
PS + CU (ET, Class I)	NI	NI
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Problems with the current CISPR 15/30 system

- A number of test setups do not adequately resemble actual interference scenarios
- The current reference is *a luminaire*, however the concept of luminaire becomes obsolete; instead we have *lighting systems*
- The variety of topologies and building blocks in a future lighting systems is infinite
- Therefore: impossible to continue the current CISPR 15/30 approach to develop reference setups @ luminaire level



How many reference setup to be developed...

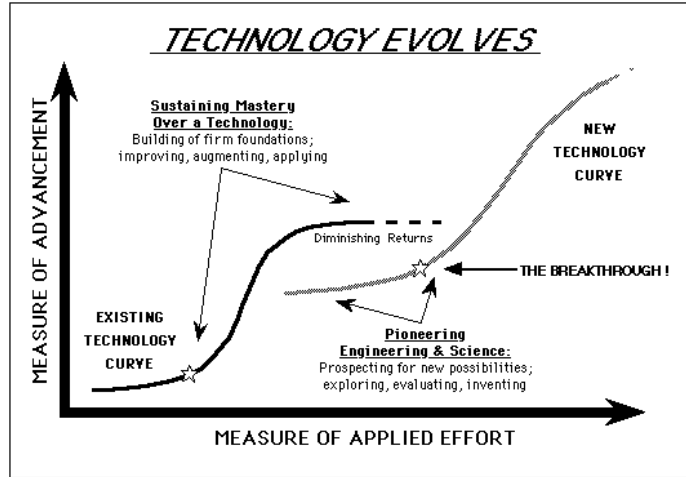


Note: AK 767.11.15 project runs for already for more than 3 years

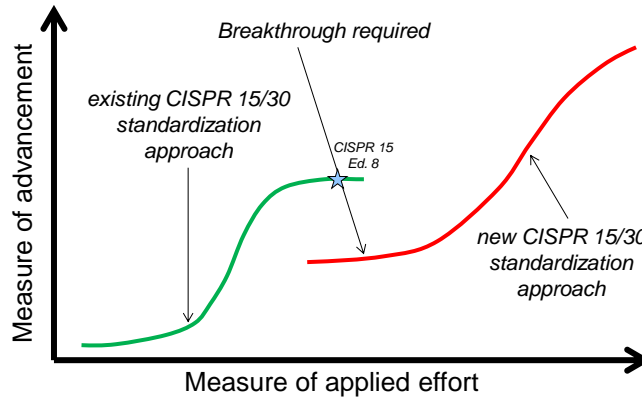
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The S-curve



Current CISPR 15/30 standardization system not suitable for LED-lighting technologies



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The full revision of CISPR 15 (Ed. 9, following the still to be published ed. 8)

- Solves the bad readability (spaghetti) of the current CISPR 15
- Eliminates outdated tests such as insertion-loss test
- Adds proper definitions
- Applies state-of-the-art EMC concepts
 - Ports
 - Frequency ranges
 - Basic measurement methods
 - ...

however it does not solve the mismatch with future SSL lighting systems and technologies

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Starting points for a new standardization system for radio disturbance measurements of lighting equipment

- Should be a sustainable and easy maintainable system
- No change of limits
- Applies a more generic approach
- Must enable market control of authorities

We can learn from...

(for CISPR 15 - systems):

- Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) (EN 50 491-5-series)
- Multimedia (CISPR 22/32)

(for CISPR 30 - built-in modules):

- Automotive (CISPR 25)
- Integrated circuits (IEC 61967-series)

Acknowledgement

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Energy efficient and intelligent lighting systems



